Material Grade: C45 (1.0503)

Other Variant(s): C45E (1.1191) – identical to C45, except for:
Max S%=0.035 and max P%=0.025 (ISO683-1) or max P%=0.030 (EN10083-2)
C45R (1.1201) – identical to C45, except for:
S%=0.020-0.040 and max P%=0.025 (ISO683-1) or max P%=0.030 (EN10083-2)
This variant is only applicable to rolled bar standards.

Associated standards:[1] BS EN ISO 683-1:2018 (current)
EN10083-2 (obsolete, all editions)
BS EN ISO683-7: 2024 (current)
ISO 683-18:2014 (current)
BS EN 10277:2018 (current)
BS EN 10250-2: 2022 (current)

Material Condition(s): No designation or +U – Untreated (as rolled)
+A – Soft annealed
+S – With improved shearability
+QT – Quench and tempered
+N – Normalised

Surface Finish: No designation or +HW – Black rolled
+RM – Rough machined – rough machined rolled or forged
+SH – Untreated and peeled/ turned (rolled bar)
+C – Cold drawn
+G - Ground

Typical tolerance(s):

Surface finish	Product type	Standard	Dimensional tolerance	Straightness	Clean-up
No designation/ +HW	Rolled bar	BS EN ISO683-1	EN10060	EN10060	ISO9443 Class A
+RM	Rolled bar + rough machined	BS EN ISO683-1	EN10060	EN10060	ISO9443 Class A
+SH, +C, +G	Rolled bright bar	BS EN ISO683-7	Defined in 683-7	Defined in 683-7	Defined in 683-7
Any designation	Forged bar	BS EN10250-2	Per agreement	Per agreement	Per agreement

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Other supply options: (*only applicable to rolled bar standards)*

+H - with an additional hardenability test for grades E and R only to the specified ranges of the standard
+HH - with an additional hardenability test (narrowed upper limit values as per standard) for grade variant E
+HL - with an additional hardenability test (narrowed lower limit values as per standard) for grade variant R

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1. TYPICAL CHEMICAL COMPOSITION *(from the most current version of the standard(s))*

%	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Cr+Mo+Ni
Min	0.42	0.1	0.5	0	0	0	0	0	0	0
Max	0.5	0.4	0.8	0.045	0.045	0.4	0.1	0.4	0.3	0.63

2. TYPICAL MECHANICAL PROPERTIES *(from the most current version of the standard(s))*

	Test type				Tensile and hardness test (at room temperature)						Impact test (KCV) *Average of 3 / individual value*
					Yield (Re)	0.2 % proof	UTS (Rm)	Elong (A)	R of A (Z)	Hardness	Room Temp
	Condition	Nominal diameter *d* (mm)	Direction	Unit	*N/mm2*	*N/mm2*	*N/mm2*	*%*	*%*	*HB*	*J*
	Untreated (No designation or +U)	-	-	Min	-	-	-	-	-	-	-
				Max	-	-	-	-	-	-	-
BLACKROLLED	With improved shearability +S	-	-	Min	-	-	-	-	-	-	-
				Max	-	-	-	-	-	255	-
	Soft Annealed +A	-	-	Min	-	-	-	-	-	-	-
				Max	-	-	-	-	-	207	-
	Quench and tempered +QT	≤ 16 ⌀	L	Min	490	-	700	14	35	-	15/10.5
				Max	-	-	850	-	-	-	-
	Quench and tempered +QT	16<d≤ 40 ⌀	L	Min	430	-	650	16	40	-	15/10.5
				Max	-	-	800	-	-	-	-
	Quench and tempered +QT	40<d≤ 100 ⌀	L	Min	370	-	630	17	45	-	15/10.5
				Max	-	-	780	-	-	-	-
	Normalised +N	≤ 16 ⌀	L	Min	340	-	620	14	-	-	-
				Max	-	-	-	-	-	-	-
	Normalised +N	16<d≤ 100 ⌀	L	Min	305	-	580	16	-	-	-
				Max	-	-	-	-	-	-	-
	Normalised +N	100<d≤ 250 ⌀	L	Min	275	-	560	16	-	-	-
				Max	-	-	-	-	-	-	-
BRIGHTROLLED	Untreated, then peeled/turned +SH	16<d≤100	L	Min	-	-	580	-	-	172	-
				Max	-	-	820	-	-	241	-
	Untreated, then cold drawn +C	5<d≤10	L	Min	-	565	750	5	-	-	-
				Max	-	-	1050	-	-	-	-
	Untreated, then cold drawn +C	10<d≤16	L	Min	-	500	710	6	-	-	-
				Max	-	-	1030	-	-	-	-
	Untreated, then cold drawn +C	16<d≤40	L	Min	-	410	650	7	-	-	-
				Max	-	-	1000	-	-	-	-
	Untreated, then cold drawn +C	40<d≤63	L	Min	-	360	630	8	-	-	-
				Max	-	-	900	-	-	-	-
	Untreated, then cold drawn +C	63<d≤100	L	Min	-	310	580	8	-	-	-
				Max	-	-	850	-	-	-	-
	Quench and tempered, then peeled/turned +QT+SH	16<d≤40	L	Min	-	430	650	16	-	-	25/17.5
				Max	-	-	800	-	-	-	-
	Quench and tempered, then peeled/turned +QT+SH	40<d≤100	L	Min	-	370	630	17	-	-	25/17.5
				Max	-	-	780	-	-	-	-
	Quench and tempered, then cold drawn +QT+C	5<d≤10	L	Min	-	595	850	8	-	-	-
				Max	-	-	1050	-	-	-	-
	Quench and tempered, then cold drawn +QT+C	10<d≤16	L	Min	-	565	810	8	-	-	-
				Max	-	-	1010	-	-	-	-
	Quench and tempered, then cold drawn +QT+C	16<d≤40	L	Min	-	525	700	9	-	-	-
				Max	-	-	900	-	-	-	-
	Quench and tempered, then cold drawn +QT+C	40<d≤63	L	Min	-	455	650	10	-	-	-
				Max	-	-	850	-	-	-	-
	Quench and tempered, then cold drawn +QT+C	63<d≤100	L	Min	-	455	650	11	-	-	-
				Max	-	-	850	-	-	-	-

FORGED	Annealed +A	-	-	Min	-	-	-	-	-	-	-
				Max	-	-	-	-	-	207	-
	Normalised +N	d≤ 100 ⌀	L	Min	305	-	580	16	-	-	-
				Max	-	-	-	-	-	-	-
	Normalised +N	100<d<160 ⌀	L	Min	275	-	560	16	-	-	18/12.6
				Max	-	-	-	-	-	-	-
	Normalised +N	160≤d≤ 250 ⌀	T	Min	275	-	560	12	-	-	10/7
				Max	-	-	-	-	-	-	-
	Normalised +N	250<d≤ 500 ⌀	T	Min	240	-	540	12	-	-	10/7
				Max	-	-	-	-	-	-	-
	Normalised +N	500<d≤ 1000 ⌀	T	Min	230	-	530	11	-	-	10/7
				Max	-	-	-	-	-	-	-
	Quench and tempered +QT	d≤ 105 ⌀	L	Min	370	-	630	17	-	-	25/17.5
				Max	-	-	-	-	-	-	-
	Quench and tempered +QT	105<d< 160 ⌀	L	Min	340	-	590	18	-	-	22/15.4
				Max	-	-	-	-	-	-	-
	Quench and tempered +QT	160≤d≤ 240 ⌀	T	Min	340	-	590	12	-	-	15/10.5
				Max	-	-	-	-	-	-	-
	Quench and tempered +QT	240<d≤ 495 ⌀	T	Min	320	-	540	11	-	-	12/8.4
				Max	-	-	-	-	-	-	-

[1] valid at the time of writing.
Whilst great care and attention has been paid to compose this datasheet but we will not take the responsibility for any errors.